

REMARKS

Applicant thanks the Examiner for a thorough examination of the present application, and respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. At the time of the outstanding Office Action, claims 1-24 and 26-29 were pending. Of these claims, claims 1, 4-7, 14, 15, 18, 24, and 28 have been amended; claims 2, 3, 8-13, 16, 17, 19, 20, and 25-27 have been canceled; and claims 30-33 have been added. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier. Thus, claims 1, 4-7, 14, 15, 18, 21-24, and 28-33 are now pending in this application.

I. Claim Objection

On page 1 of the Office Action, claim 1 was objected to for a minor informality. In response to this objection, Applicant has amended the claim in the manner suggested by the Examiner. As such, Applicant respectfully requests withdrawal of the objection to claim 1.

II. 35 U.S.C. § 112, second paragraph

On page 1 of the Office Action, claims 3, 5-7, 14, 17, 24, 27, and 28 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for “failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.”

In particular, and with regard to claims 3, 5-7, 14, 17, 27, and 28, the Examiner asserted that the use of the terms “e.g.”, “such as”, and “or the like” renders the claim indefinite. In response, Applicant has removed these terms from claims 5-7, 14, and 28. In making these amendments, Applicant does not intend to narrow the scope of these claims, nor does it intend to surrender any claim scope with regard to the Doctrine of Equivalents. With regard to claims 3, 17, and 27, Applicant has canceled these claims rendering the rejection of these claims moot.

With regard to claim 24, the Examiner rejected the claim for lack of proper antecedent basis. In response, Applicant has corrected the antecedent issue and therefore requests withdrawal of this rejection.

III. 35 U.S.C. § 102(b)/103(a)

On page 5 of the Office Action, claims 1-9, 13-16, 21-24, 28, and 29 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,419,187 to Buter et al. ("Buter"). On page 6 of the Office Action, claims 10-12 and 17-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Buter in view of U.S. Patent No. 6,213,433 to Gruensfelder et al. ("Gruensfelder"). Also on page 6 of the Office Action, claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Buter in view of GB 2308836 to Fagg ("Fagg"). Applicant notes that claims 2, 3, 8-13, 16, 17, 19, 20, and 25-27 have been canceled and therefore these rejections are moot. With respect to the rejections of the remaining claims, Applicant respectfully traverses the rejections for at least the reasons set forth below.

Independent Claim 1

Applicant respectfully submits that Buter, Gruensfelder, and Fagg, whether considered alone or in combination, do not teach or suggest all of the features recited in claim 1, as amended.

Buter discloses "a thin-walled profile with material or structural anisotropisms provided locally in the profile to allow the contour of the profile to deform in a predetermined manner." (*See*, col. 2, lines 15-18). These anisotropisms are configured to "deform the shape of the profile cross-section specifically and actively." (*See*, col. 2, lines 25-27). The variation in the profile may be due to external stimuli, such as an external force, or due to influence from actuator means. (*See, e.g.*, col. 2, lines 20-23 and 31-36). When actuator means are used, the actuator forces may be introduced globally or locally to individual anisotropic members whereby the shape of the whole profile may be changed. (*See, e.g.*, Figures 1-5). With regard to the positioning and form of the actuators, Buter does not provide any details other than the list of

suitable actuators recited at col. 2, lines 38-43, and the discussion in claim 2 that the actuators “introduce force globally.” Accordingly, Buter generally discusses a thin walled profile that allows for the whole profile to be influenced by external stimuli or an actuator.

Buter, however, does not teach or suggest a shape deformable airfoil section comprising “a substantially non-deformable part and one or more deformable parts,” as recited in independent claim 1. (Emphasis added). In addition, Buter does not teach or suggest “an outer surface of at least one of the deformable parts is defined by skin made of a flexible material, wherein the said skin is attached to the substantially non-deformable part, and wherein the actuator means is situated within the skin,” as recited in independent claim 1. (Emphasis added). Still further, Buter does not teach or suggest that “at least one of the shape deformable parts is made of flexible material(s), wherein the actuator means is(are) an extendable beam(s) extending within the flexible material(s), and the extendable beam(s) is(are) made from a material composition(s) which elongation(s), shortening(s) and/or bending(s) is (are) controllable by applied electrical current(s),” as recited in independent claim 1. (Emphasis added). For at least these reasons, Applicant respectfully submits that Buter does not anticipate or obviate independent claim 1 as amended.

Gruensfelder does not cure the deficiencies associated with Buter. Gruensfelder discloses a leading edge for an aircraft that has a hard durometer elastomer tip. (*See, e.g.*, figure 5 and abstract). The hard durometer tip is connected to a structure of the aircraft via elastomer panels attached to a rigid block. The shape of the leading edge is altered by using actuators to apply a force or a moment to the hard durometer tip and/or the rigid block. These actuators are all illustrated as bulky members, and therefore do not provide for a solution where the actuators can be built into a shape deformable part, much less built in the skin of a shape deformable part.

Accordingly, Applicant respectfully submits that Gruensfelder also fails to teach or suggest “an outer surface of at least one of the deformable parts is defined by skin made of a flexible material, wherein the said skin is attached to the substantially non-deformable part, and wherein the actuator means is situated within the skin,” as recited in independent claim 1.

(Emphasis added). Moreover, Gruensfelder does not teach or suggest that “at least one of the shape deformable parts is made of flexible material(s), wherein the actuator means is(are) an extendable beam(s) extending within the flexible material(s), and the extendable beam(s) is(are) made from a material composition(s) which elongation(s), shortening(s) and/or bending(s) is (are) controllable by applied electrical current(s).” as recited in independent claim 1. (Emphasis added). For at least these reasons, Applicant respectfully submits that Gruensfelder does not cure the deficiencies of Buter.

Fagg does not cure the deficiencies associated with Buter and Gruensfelder. Fagg discloses an elongated aerodynamic and/or hydrodynamic lifting structure. (*See, e.g., Abstract*). The structure is composed of sections having different mechanical properties, which results in the actual shape of the whole structure being dependent on the external loadings. (*See, e.g., page 3, 2nd paragraph*). As such, is possible to induce changes in the aerodynamic and/or hydrodynamic properties.

Fagg, however, does not teach or suggest “an outer surface of at least one of the deformable parts is defined by skin made of a flexible material, wherein the said skin is attached to the substantially non-deformable part, and wherein the actuator means is situated within the skin,” as recited in independent claim 1. (Emphasis added). Moreover, Gruensfelder does not teach or suggest that “at least one of the shape deformable parts is made of flexible material(s), wherein the actuator means is(are) an extendable beam(s) extending within the flexible material(s), and the extendable beam(s) is(are) made from a material composition(s) which elongation(s), shortening(s) and/or bending(s) is (are) controllable by applied electrical current(s),” as recited in independent claim 1. (Emphasis added). For at least these reasons, Applicant respectfully submits that Fagg does not cure the deficiencies of Buter and Gruensfelder.

For at least the above reasons, Applicant respectfully submits that independent claim 1 is allowable over Buter, Gruensfelder, and Fagg. Since claims 4-7, 14, 15, 18, 21-24, and 28-31 depend from independent claim 1, Applicant respectfully submits that these claims are allowable

for at least the same reasons as claim 1, in addition to their own reasons which Applicant reserves the right to argue at a later point if necessary.

Independent Claim 32

New claim 32 has been added to further protect aspects of the present application. Based on Applicant's review of the cited references, Applicant believes that none of the cited references teaches or suggests the features set forth in claim 32. Since each of these references has been discussed in detail above, Applicant incorporates its discussion from above and respectfully submits that none of the cited references teaches or suggests at least (1) a sheet of smart material, wherein the sheet of smart material is located within the skin and is configured to receive control signals and control movement of the deformable part based on the received control signals; (2) skin comprising flexible material, wherein the skin forms an outer layer of the deformable part; and (3) a connection between a non-deformable part and a deformable part that is substantially continuous. As such, Applicant respectfully submits that independent claim 32 is allowable over the cited references.

Independent Claim 33

New claim 33 has also been added to further protect aspects of the present application. In order to not be cumulative, Applicant incorporates its discussion from above and respectfully submits that none of the cited references teaches or suggests the features set forth in claim 33. In particular, Applicant respectfully submits that the cited references, whether considered alone or in combination, do not teach or suggest at least (1) a beam comprised of smart material, wherein the beam is attached to the non-deformable part and extends into the deformable part, said beam configured to receive control signals and control movement of the deformable part based on the received control signals; and (2) a deformable part comprising one or more voids. Accordingly, Applicant respectfully submits that independent claim 33 is allowable over the cited references.

CONCLUSION

Because none of the references cited by the Examiner, either separately or in combination with each other, teaches or suggests all of the features recited in independent claims 1, 32, and 33, Applicant submits that independent claims 1, 32, and 33 are patentable over these cited references. Furthermore, because dependent claims 4-7, 14, 15, 18, 21-24, and 28-31 are each directly or indirectly dependent upon independent claim 1, Applicant submits that each of these claims are allowable for at least the same reasons discussed above, in addition to their own reasons which Applicant reserves the right to argue at a later time if necessary.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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